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Implementation of the Basel Accords I and II in Greek Banking System: The Application of Standardized Approach

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Abstract.

This paper focuses on the analysis of the main implications of Basel I and Basel II, based on risk sensitiveness due to credit risk, in Greek Banking System and assesses their effect per portfolio and per Bank in order to evaluate capital charges and to measure credit risk exposure. In this paper, an attempt is made to examine the effect of the Basel Accords on Greek Banks, which active in Greece, listed in the Greek stock market and supervised by Bank of Greece. In particular, after conducting a series of alternative scenarios of adverse events for various factors, the new capital requirements were estimated according to the standardized approach, introduced by the two existing Accords. In addition, the convergence or divergence of the approach for both Accords was evaluated as regards the evaluation of three "representative Banks", each of which forms a "synthesis" of three categories of Banks (small, medium, large) to which the set of main Greek Banks was partitioned. A series results come up regarding the level of capital charges that the Banks hold, depending on the size of their portfolios, the type of their assets and the overall policy that is applied. Findings contribute that a benefit from capital requirements occurs due to credit risk, but may be hedged by capital requirements due to operational risk. The final level of capital requirements improvement may be accomplished by specific provisions allocation for loans that were defaulted. The findings from standardized approach application could assist the Greek Banking System in order to create reliable risk management, strategies, credit policies and a prudential framework for credit institutions. In particular, the model formed provides important information to analysts so that they can come up with immediate results concerning the change in capital requirements of a Bank during the transition from Basel I Accord to the Basel II Accord, based on the methodology followed. It will mainly provide information for supervisory reasons either internal information of the level of capital maintained depending on the nature activities and the risks, which are taken by a Bank. Scientific researchers who have been examined the impact of the Basel Accords on Greek Banks and especially in capital requirements as well as in Bank behaviour is very limited. Also, up to now, the impact of adverse events on the loan portfolios of the Greek Banking System has not yet been satisfactorily evaluated.

Keywords: Banks, Basel Accords, Capital Requirements, Credit Risk, Banking Supervision.

Classification JEL: G21, G28.

1. Introduction

Basel Committee issued a comprehensive set of regulatory measures to enhance the banking regulatory framework and strengthen supervision and risk management of banking sector. Based on Basel Accords Standards, banks are required to hold appropriate level of capital against unexpected losses or exceptional events that may occur. Basel Framework focuses on credit risk and risk weighted assets

(RWA) and requires banks to hold appropriate level of capital against unexpected losses or exceptional events that may occur (minimum capital ratio of capital to RWA for all banks to be at 8%). Furthermore, supervisors determine whether banks have adequate process, which take into account risk profile and market and macroeconomic conditions (Basel Committee on Banking Supervision, 1988; 1999; 2001a; 2006a; Hendrichs and Hirtle, 1997; Bank of Greece, 1999; Santos, 2000). Banks are required to hold an appropriate level of capital in order to be able to deal adequately and effectively risk exposures that may arise from their business activities. The amount of capital requirements is determined, mainly, by the size and the structure of loan portfolio, the quality of which is quantified by certain parameters (probability of default, exposure at default, etc.) and the financial regulator who set the capital adequacy ratio of equity (percentage of risk weighted assets) (Basel Committee on Banking Supervision, 2001a; 2001b; 2004). Banks should maintain adequate capital (equal to at least 8% of risk-weighted assets) beyond the regulatory minimum in order to cover unexpected losses and keep themselves solvent in a crisis (Jones and Mingo, 1999; Crouhy et al, 2000; Jackson, 2002). In order to determine capital requirements, on-balance sheet and off-balance sheet exposures are weighted respectively with risk (based on Basel I and Basel II requirements). Basel I take into account only credit and market risk, while Basel II defines a minimum regulatory operational risk capital charge. While risk calculation based on the first Accord uses predetermined coefficients that correspond to each exposure (eg. classifies assets according to the level of risk associated with it, with a range from risk-free assets at 0% to risk assessed at 100%), the second Accord develops a more elaborate methodology which takes into account the factors that determine the degree (high or low risk) and, analogously, the level of exposure. While Basel I suggests the use of one approach (standardized approach (ST)), Basel II suggests the use of two approaches (standardized approach and internal rating based approach (IRB)). The application of standardized approach of Basel II presents similarities with respective approach of Basel I (calculation of risk based on supervision coefficients), but includes also factors for calculating the total results (delinquencies, collaterals, credit ratings etc.) (Basel Committee on Banking Supervision, 2000; 2001a; 2001b; 2003a; 2004; 2006a; Ayadi and Resti, 2004; Ozdemir and Miu, 2009). The Basel Committee on Banking Supervision conducted data collection exercises (Quantitative Impact Studies) to assess the impact of Basel framework on banking system capital requirements. These studies were performed on a voluntary and confidential basis. The studies were repeated on semi-annual basis with end-December and end-June reporting dates in order to create reliable risk management strategies and prudential framework for credit institutions (Basel Committee on Banking Supervision, 2001c; 2002; 2003b; 2005; 2006b). Greek Banks, participated to the Quantitative Impact Study in 2003b where they used the standardized approach. However, up to now, the effects that will be brought upon the capital requirements of the Greek Banking System, the reserved capital for hedging the risks undertaken that have been calculated by the application of the standardized approach, have not been yet fully evaluated as to the existence, the extent and the magnitude of changes. Important issues, like which categories of Banks will be more affected, which parts of portfolios will have the major changes as to their size and extent, what will be their degree of impact , etc., which do not only concern issues of a qualitative character, have not had the necessary quantitative corroboration.

In this paper, we examine the effect of Basel I and Basel II Accords on Greek Banks, which are active in Greece, listed on the Greek stock market, and supervised by the central Bank of Greece. In particular, after conducting a series of alternative scenarios for various factors, which affects risk-weighted assets and capital requirements, according to Basel I and Basel II, standardized approach was assessed. In addition, the convergence/ divergence of the approaches for both accords were evaluated for each "representative Bank" (Bank 1, Bank 2 and Bank 3). A model was developed, based on the standardized approach for minimum capital requirements calculation set out by Basel I and II Accords and a series of simulation scenarios was applied.

2. Data and Model

Our sample consists of 18 Greek Banks operating in business in Greece, listed in the Greek stock exchange supervised by the Bank of Greece and whose total assets correspond to about 80 - 90% of the assets of the entire banking sector in Greece. We are interested in the impact of banking prudential regulations on the banking system, specifically on bank capital. The banks in the sample were grouped into three separate groups based on the size of their assets. The application of the methodology developed by Hartigan (1975) and Bartholomew et al. (2002) led us to group banks in the following categories: (a) The category of the large banks which includes the four larger banks (Bank 1); (b) The category of medium size banks which includes the next four banks based on their size (Bank 2); (c) The small banks category which includes ten banks (Bank 3).

The three representative Banks (Bank 1, Bank 2 and Bank 3) that are corresponding to the three categories Banks (Bank 1, 2 and 3) are differed in size, structure, capital structure and profitability and thus it is likely the transition to Basel II to have on these different effects. The model accepts aggregate data per portfolio type, type of collateral, degree of coverage of the risks taken with respect to the exposure etc. The data that feed the model are taken from balance sheets, annual and supervisory reports.

From 2007 fiscal year balance sheets analysis of the three representative Banks, the 80%, 65% and 10% of the capital comes mainly from deposits and loans for Bank 1, 2 and 3, respectively, which based on their nature and characteristics are elements that generate costs. It should be mentioned that 2007 was a crucial period for Greek Bank System since, starting from August 2007; the financial crisis began to exert upward pressure on bank interest rates in the money markets of developed economies, while the monetary and credit magnitudes kept on exhibiting large increases. Table 1 displays all financial data for the three Banks (Bank 1, Bank 2 and Bank 3).

Table 1. Basic Indicators Analysis by Bank

	Banks	Bank 1	Bank 2	Bank 3
	Assets (in EUR)	235.713.397.000	76.312.377.172	24.824.817.920
	Capital (α EUR)	16.907.423.000	381.616.4278	2.149.518.304
Profitability	Profit / Capital	17,72%	12,17%	9,47%
	Profit / Risk Weighted Assets	1,95%	1,03%	1,14%
	Net Interest Margin	3,04%	3,08%	2,63%
	Net Interest Income / Risk Weighted Assets	3,39%	4,00%	3,17%
Risk - Capital Adequacy	Risk Weighted Assets / Total Assets	65,21%	59,16%	72,24%
	Core Equity Ratio	9,67%	8,43%	10,86%
	Capital Adequacy Ratio	13,77%	9,31%	12,91%
Provisions Adequacy	Annual Provisions / Net Interest Income	16,24%	20,46%	20,94%
	Accounting Provisions / Regulatory Provisions	65,73%	96,74%	76,84%
	Non-Performing Loans net of Provisions / Regulatory Capital	14,62%	46,07%	24,91%
	Regulatory Provisions Shortfall/ Regulatory Capital	4,51%	3,65%	10,67%

The data set contains all loans in current and overdue status per asset class, accumulated provisions, parameters values, which Basel Accords and, hence, Bank of Greece imposes for estimating the credit and operational risk in order to calculate their capital adequacy. Moreover, data were classified per asset class (types of loans), product type, risk category, type of collateral, etc. Balance sheets, annual reports, and regulatory reports provide the data that are used in the model. Financial data and overdue appearing on the portfolios of Greek Banks, provisions and the values of the parameters, which the Basel Accords, and, hence, the Bank of Greece imposes for estimating the credit and operational risk as well as the calculation of the banking institutions capital adequacy.

The model attempts to estimate the risk of lending in order to identify the corresponding capital requirements for banks credit risk and their capital adequacy. Since different types of assets have different risk profiles, weighting assets according to their level of risk primarily adjusts for assets that are less risky by allowing banks to discount lower-risk assets. Risk-weighted assets are calculated for all portfolios of the three banks, based on the type of the exposures and scenarios are applied were risk elements (such as exposure, profitability of default, failure to fulfill counterparty's obligation etc.) are applied. Then capital requirements were recalculated based on new conditions (worsens or not).

3. Standardized Approach

3.1. Procedure for calculating the financial figures and ratios

Under the standardized approach and based on predefined criteria, exposures were slotted into each respective regulatory category for each product line, due to capital requirements calculation. Basel II is more risk-sensitive than Basel I, since Basel I rules for calculating risk weighted assets reflected only to the economic risk of a transaction and on a limited extent. Furthermore, Basel II Accord bases credit risk weightings on a simple approach (ratings of external rating agencies) or on more sophisticated ones (banks' own internal ratings). The tailored to the institution's risk profile, through more risk buckets and higher risk weights for standardized approach compared to standard risk weights that Basel I applied. In addition, in order to raise the quality and the level of the capital base, there is need to ensure that all material risks are captured in the capital framework. Moreover, general provisions should be created against the possibility of future losses for each exposure (collective or individual basis), as defined by the regulatory framework (Basel I and Basel II). For each Bank (Bank 1, 2 and 3) three scenarios were implemented, based on the extent of provision to default loans. The diversification of regulatory factors regards mainly: (a) Non default and default loans, (b) Retail and Corporate Banking, (c) Mortgage lending, depending on the collateral (LTV: Loan / Value).

Regulatory ratios of non-performing loans are differed according to the rate of coverage by specific provisions that are calculated by each Bank and each exposure (eg. mortgage loan, car loan, etc.). Scenarios results for the three representative Banks are shown in Tables 2, 3 and 4. It should also be mentioned that Basel II introduces capital requirements for operational risk, a risk category that was not explicitly addressed under the Basel I rules.

3.2. Bank 1

For the first representative Bank (Bank 1), the amount of assets is equal to € 235 billion, while the capital is around € 17 billion. The development of the three scenarios for the Bank 1 (Table 2) gives the following results:

Table 2. Bank 1 Risk Weighted Analysis per Portfolio (in thousands Euro)

Portfolio Type	Coverage 0%		Coverage 31,58%		Coverage 61,76%	
	RWA Basel I	RWA Basel II	RWA Basel I	RWA Basel II	RWA Basel I	RWA Basel II
Small Enterprises (non-defaulted)	20.317.708	20.317.708	20.317.708	15.238.281	20.317.708	15.238.281
Small Enterprises (defaulted, Coverage<20%)	750.144	750.144	513.249	769.873	286.855	430.283
Small Enterprises (defaulted, Coverage>20%)	-	-	139.350	139.350	272.523	272.523
Large Corporate (non-defaulted)	63.693.041	63.693.041	63.693.041	63.693.041	63.693.041	63.693.041
Large Corporate (defaulted, Coverage<20%)	2.447.626	2.447.626	1.674.665	2.511.998	935.972	1.403.958
Large Corporate (defaulted, Coverage>20%)	-	-	472.364	472.364	923.788	923.788
Mortgage LTV < 75% (non-defaulted)	15.017.733	15.017.733	15.017.733	10.512.413	15.017.733	10.512.413
Mortgage LTV > 75% (non-defaulted)	1.698.708	1.698.708	1.698.708	2.548.062	1.698.708	2.548.062
Mortgage LTV < 75% (defaulted, Coverage<20%)	519.390	519.390	355.366	710.733	198.614	397.229
Mortgage LTV < 75% (defaulted, Coverage>20%)	-	-	138.124	138.124	270.126	270.126
Mortgage LTV > 75% (defaulted, Coverage<20%)	72.598	72.598	49.671	149.015	27.761	83.285
Mortgage LTV >75% (defaulted, Coverage>20%)	-	-	18.099	36.199	35.397	70.795
Retail (non-defaulted)	19.329.601	19.329.601	19.329.601	14.497.200	19.329.601	14.497.200
Retail (defaulted, Coverage<20%)	766.461	766.461	524.412	786.619	293.094	439.642
Retail (defaulted, Coverage>20%)	-	-	128.143	128.143	250.605	250.605
Operational Risk	-	11.738.371	-	11.738.371	-	11.738.371

For the first scenario the coverage of each exposure was set equal to zero, based on relevant provisions, which indicates that in none of the loans that were defaulted, special provisions were over 20%. For this case, according to Basel I, the total weighted assets will be equal to € 124.6 million; while in Basel II will be equal to € 125 million. This difference in total risk weighted assets, on credit risk, is equal to € 817 thousand. For Basel II approach, we have additional capital requirements, due to the operational risk considered in this approach. In "Small Business non-default loans" portfolio, in Basel II weighted assets are at 75%, while in Basel I at 100%, which reflects to a reduction that amounts € 5 billion. In non-defaulted mortgage loans with low LTV (weighted assets for Basel II are equal to 35%, while in Basel I to 50%) lead to a benefit equal to € 4,5 billion. Finally, in non-defaulted consumer loans (weighted in Basel II are equal to 75%, while in Basel I to 100%) the benefit of this variation is equal to € 4,8 billion. On the other hand, an increase is appeared in risk-weighted assets in defaulted loans, with higher effect in corporate defaulted loans. Provisions coverage of those loans is less than 20% and the relative increase is equal to € 1,2 billion. The higher increase is due to operational risk and it is equal to € 11,7 billion. Based on all these changes a marginal increase of risk weighted assets (Basel II compared with Basel I) exceeds the amount of € 817 million, which corresponds to 0.66% of risk weighted assets based on Basel I.

In the second scenario banks set aside more in provisions than they expected to lose, which lead to lower risk weighted assets. Increase of provisions coverage will result in a reduction of regulatory coefficients, which are applicable to defaulted loans. For the three categories of defaulted loans (retail, corporate and mortgage lending, with LTV <75% and consumer credit), same improvement is occurred as in the first scenario € 5 billion, € 4,5 billion and € 4,8 billion, respectively. For defaulted loans portfolios a significant improvement of 30% appears. Indeed, while defaulted loans for corporate portfolio in the first

scenario increased € 1,2 billion, in the second scenario the increase was € 837 million. In the second worst category of defaulted loans, mortgage defaulted loans are reduced from € 519 million to € 355 million. This reduction in risk weighted assets of defaulted loans that occurred due to provisions coverage, lead to a variation of € -466 thousand, that is almost 0% percentage change.

In the third scenario, the provisions that were set aside for non-performing loans over 20% were equal to 61.76%. For the three major defaulted loan categories same set aside risk weighted assets occurs. In defaulted loans the decrease is higher as € 1,2 billion (Scenario 1) has reached € 468 million and € 519 million (Scenario 1) to € 198 million. If a capital charge for operational risk covers unexpected losses due to operational risk, then risk weighted assets will decrease € 782 million that is 0, 63%.

3.3. Bank 2

For the second representative Bank (Bank 2), the amount of assets is equal to € 76 billion, while the capital is € 3,8 billion. Main findings for Bank 2 are summarized as follows:

Table 3. Risk Weighted Analysis per Portfolio (in thousands Euro)

Portfolio Type	Coverage 0%		Coverage 45,42%		Coverage 100%	
	RWA Basel I	RWA Basel II	RWABasel I	RWABaselII	RWABaselI	RWABasel II
Small Enterprises (non-defaulted)	6.784.562	5.088.422	6.784.562	5.088.422	6.784.562	5.088.422
Small Enterprises (defaulted,Coverage <20%)	460.558	690.837	251.372	377.059	-	-
Small Enterprises (defaulted,Coverage >20%)	-	-	123.050	123.050	270.916	270.916
Large Corporate (non-defaulted)	12.787.654	12.787.654	12.787.654	12.787.654	12.787.654	12.787.654
Large Corporate (defaulted,Coverage <20%)	1.803.703	2.705.554	984.461	1.476.691	-	-
Large Corporate (defaulted,Coverage >20%)	-	-	500.647	500.647	1.102.263	1.102.263
Mortgage LTV< 75% (non-defaulted)	7.532.826	5.272.978	7.532.826	5.272.978	7.532.826	5.272.978
Mortgage LTV< 75% (defaulted,Coverage <20%)	392.653	785.306	214.310	428.620	-	-
Mortgage LTV< 75% (defaulted,Coverage >20%)	-	-	150.183	150.183	330.655	330.655
Mortgage LTV> 75% (non-defaulted)	690.148	1.035.222	690.148	1.035.222	690.148	1.035.222
Mortgage LTV> 75% (defaulted,Coverage <20%)	40.987,28	122.961	22.370	67.112	-	-
Mortgage LTV> 75% (defaulted,Coverage >20%)	-	-	14.697	29.394	32.358	64.716
Retail (non-defaulted)	5.891.266	4.418.449	5.891.266	4.418.449	5.891.266	4.418.449
Retail (defaulted,Coverage <20%)	524.531	786.797	286.289	429.434	-	-
Retail (defaulted,Coverage >20%)	-	-	126.128	126.128	277.693	277.693
Operational Risk		4.049.826	-	4.049.826	-	4.049.826

For the first scenario the coverage of each exposure after calculating relevant provisions (over 20%) was set equal to zero, which indicates that in none of the loans that were defaulted, special provisions were

held over 20%. For this case, according to Basel I, the total weighted assets are equal to € 36 billion; while in Basel II are equal to € 37 billion. A considerable variation across the two methods in risk weighted assets due to credit risk is equal to € 835 million. Furthermore, capital requirements, calculated for operational risk (Basel II) are equal with € 4 billion, while market risk estimation for both methods is marginal. Therefore, the minimum changes introduced by Basel II do not affect significantly the final results. Regarding portfolio analysis, high decreases are noticed in three portfolios: (a) The non-default small business loan portfolio (weighted Basel II by 75% and Basel I by 100%), equals € 1,7 billion. (b) The non-default mortgage loans with low LTV (weighted Basel II by 35% and Basel I by 50%) equal € 2,3 billion. (c) The non-default consumer loans (weighted Basel II by 75% and Basel I by 100%) equals € 1,5 billion. On the other hand, an increase in risk weighted assets in defaulted loans appears, with higher effect in corporate defaulted loans, whose provisions coverage below 20% equals € 902 million. A relative increase occurs for mortgages loans, where loan balance to loan-to-value ratio> 75% is equal to € 82 million. Operation risk lead to higher risk weighted assets (€ 4 billion). Based on all these modifications, a marginal increase of risk weighted assets elements is arising and it is equal to € 835 million comparing the two methods (2,26% of RWA – Basel I).

In the second scenario a higher coverage by provisions is taken, which leads to lower risk-weighted assets. Higher coverage predictions lead to a reduction of regulatory rates that are applicable to defaulted loans. For the three categories of defaulted loans (retail business loans, mortgage loans with LTV <75% and consumer loans) the same modification appears (as in the first scenario), equal to € 1,7 billion, € 2,3 billion and € 1,5 billion, respectively. For business corporate loans modification is equal to zero. For corporate defaulted loans portfolios, there is a significant modification equal to € 834 million, which leads to an increase of € 492 million, while in the previous scenario; the increase was € 901 million. In the second category of defaults, in default mortgage loans (LTV <75%) the € 392 million. Increase is limited to € 214 million in this scenario. Finally, with LTV> 75%, of default mortgage loans from € 82 million, as it was described in the first scenario, a reduction occurs (€ 59 million). The risk weighted assets reduction of defaulted loans, due to provisions coverage, leads to a modification equal to € 906,7 thousands (marginal change equal to 0% of total assets, on Basel I and Basel II.).

In the third scenario, risk coverage provisions over 20%, is equal to 61.76%. For the three major categories of non-defaulted loans (small businesses loans, mortgages with LTV <75% loans and consumer loans), reduction is occurred respectively € 1,7 billion, € 2,3 billion, € 1,5 billion on total risk weighted assets. Apart from mortgages with LTV> 75% and provisions over 20%, where a marginal increase of € 32 million is occurred, all other defaulted loans variations will be equal to zero. If a capital charge for operational risk is also calculated, then the overall reduction of the risk weighted assets is equal to € 1 billion or otherwise 2.8% of risk weighted assets as defined by Basel I.

3.4. Bank 3

For the third representative Bank (Bank 3), the amount of assets is equal to € 24,8 billion, while the capital is € 2,1 billion. Main findings for Bank 3 are summarized as follows:

Table 4. Bank 3 Risk Weighted Analysis per Portfolio (in thousands Euro)

Portfolio Type	Coverage 0%		Coverage 44,22%		Coverage 88.44%	
	RWA Basel I	RWA Basel II	RWA Basel I	RWA Basel II	RWA Basel I	RWA Basel II
Small Enterprises (non-defaulted)	3.029.998	2.272.498	3.029.998	2.272.498	3.029.998	2.272.498
Small Enterprises (defaulted,Coverage<20%)	113.804	170.707	63.480	95.220	13.155	19.733
Small Enterprises (defaulted,Coverage 20%)	-	-	29.602	29.602	59.205	59.205
Large Corporate (non-defaulted)	8.787.838	8.787.838	8.787.838	8.787.838	8.787.838	8.787.838
Large Corporate (defaulted,Coverage<20%)	506.142	759.213	282.326	423.489	58.510	87.765
Large Corporate (defaulted,Coverage>20%)	-	-	136.776	136.776	273.552	273.552
Mortgage LTV <75% (non-defaulted)	1.353.919	947.743	1.353.919	947.743	1.353.919	947.743
Mortgage LTV < 75% (defaulted,Coverage<20%)	45.794	91.588	25.544	51.088	5.293	10.587
Mortgage LTV < 75% (defaulted,Coverage 20%)	-	-	17.052	17.052	34.105	34.105
Mortgage LTV > 75% (non-defaulted)	613.883	920.825	613.883	920.825	613.883	920.825
Mortgage LTV > 75% (defaulted,Coverage<20%)	41.240	123.721	23.003	69.011	4.767	14.302
Mortgage LTV (defaulted,Coverage 20%) > 75%	-	-	14.397	28.794	28.794	7.589
Retail (non-defaulted)	2.007.165	1.505.373	2.007.165	1.505.373	2.007.165	1.505.373
Retail (defaulted,Coverage<20%)	256.493	384.740	143.072	214.608	29.650	44.475
Retail (defaulted,Coverage>20%)	-	-	60.046	60.046	120.093	120.093
Operational Risk	-	1.470.158	-	1.470.158	-	1.470.158

For the first scenario, where no specific provisions have been made and provisions coverage is less than 20% (coverage = 0%), for Basel I total weighted assets is equal to € 16,8 billion, while on Basel II is equal to € 17,4 billion. Due to the two methods adjustment, the difference in total risk weighted assets for credit risk is equal to € 678 million. Capital requirements for operational risk (Basel II) are equal to € 1,5 billion, while capital requirements for market risk (for both methods) are almost equal. For the three major categories of non-defaulted loans, (small businesses loans, mortgages with LTV <75% loans and consumer loans), a respectively decrease exists which is equal to € 757 million, € 406 million and € 502 million of the total weighted assets respectively. Defaulted loans variation will be for small business loans equal to € 57 million, for large business loans € 253 million, for mortgage lending loans € 128,3 million and for consumer loans € 128 million. If a capital charge for operational risk is also calculated, (€ 1,5 billion), risk weighted assets will increase to € 678 million, (4% increase).

In the second scenario more provisions have been created against losses, which lead to a reduction in risk weighted assets. Higher provision coverage will lead to a reduction of regulatory rates (applicable to loans in default). For defaulted loans (retail loans, corporate loans and mortgage lending with LTV <75% loans), as in the first scenario, the same improvement occurs which is equal to € 757 million, € 406 million and € 502 million, respectively. A reduction in the value of risk weighted assets is noticed and therefore an advantage for the Bank. In particular, for small business portfolio loan, a reduction is occurred from € 57 billion to € 32 billion due to risks that may occur by this type of exposure. Corporate and mortgage LTV <75% and consumer portfolio had also reductions in capital requirements € 253 billion to € 141 billion, € 46 billion to € 26 billion and € 128 billion to € 72 billion, respectively. Finally,

in this scenario, an increase is occurred to the weighted assets by 442 million, (2.7% i.e. a percentage increase). Therefore, an improvement is noticed over the first scenario, which is equal to € 236.1 million.

In the third scenario, risk coverage provisions over 20%, is equal to 61.76%. For the three major categories of non-defaulted loans (small businesses loans, consumer loans and mortgages with LTV <75% loans), reduction is occurred, respectively, € 757 million, € 502 million and € 406 million on total risk weighted assets. Apart from provisions, in all defaulted loans, zero or marginal increases of risk weighted assets arise. If a capital charge for operational risk is also calculated, (€ 1,5 billion), risk weighted assets will increase to € 206 million,(1.25% percentage increase).

3.5. Relationship between percentage change of weighted assets and the remaining provisions of performing loans with the percentage provisions coverage

From the above analysis that was held for the three representative Banks, it is quite evident that specific provisions were created against defaulted exposures, in order to address individual risks, which led to higher variations of risk weighed assets. If default coverage ratio increases then risk weighted assets will be reduced.
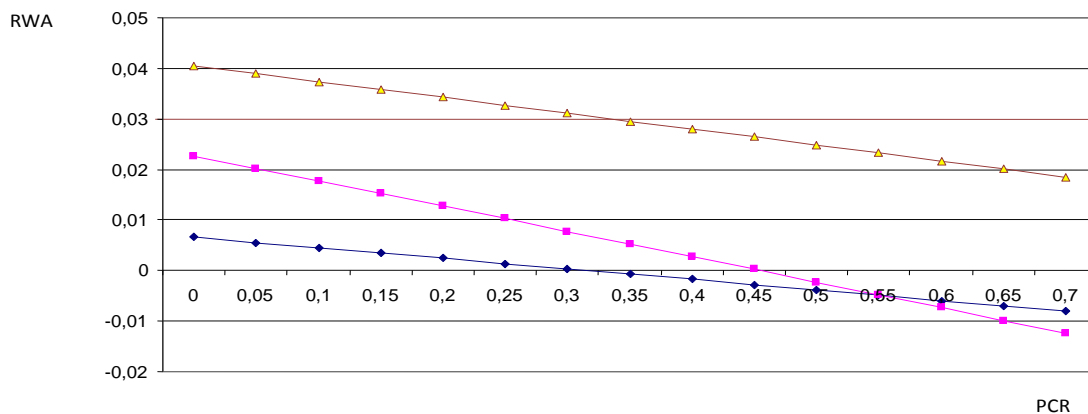

Fig 1: Risk Weighted Assets (RWA) Percentage Changes to Provision Coverage Ratio (PCR)

Regulatory framework has certainly put the highest burden of adjustment on Bank 3. Bank 1, based on its structure and supervisor's framework adjustment, has the most accurate risk-weighted assets measurement. If optimum coverage is implemented, using special provisions for maximum coverage of defaulted loans, Bank 2 is benefited more. Even though Bank 1 maximizes provisions that are booked in defaulted exposures, risk weighted assets will remain higher than those of Basel I. It should be noted that Bank 1 bear more risks, without satisfactory adequacy of respective provisions to be appeared. Although Bank 2 is more burden to Bank 1 with appropriate provisions allocation, risk weighted assets can be improved compared to the ones of Bank 1. This is due to sufficient predictions that Bank 2 has made compared to Bank 1, and can use them effectively. The reliefs are more in Bank 1 and less in Bank 3 due to retail loans portfolio allocation or to fewer defaults that are existed and are "punished" by the regulatory framework.

The higher the ratio of provisions over defaulted loans (above 20%), the lower is the ratio provisions over performing loans. In particular, if defaulted loans percentage that is covered by provisions over 20% is equal to 30%, then the remaining provisions that are allocated to performing loans will be equal: (i) 150% for Bank 1. (ii) 480% for Bank 2. (iii) 290% for Bank 3. If the coverage provision ratio increases, then a reduction in remaining provisions will be noticed and will be more significant for Bank 2.
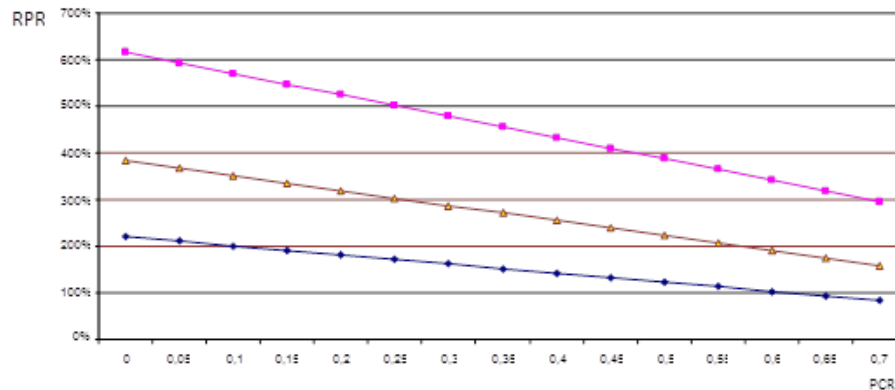
Fig 2: Percentage Changes of Residual Provision Ratio (RPR) to Provision Coverage Ratio (PCR)

4. Concluding Remarks

Reduction overall capital requirements under the standardized approach for all three (representative) Banks was implied due to credit risk (vs Basel I). This reduction was mainly occurred in retail and mortgage portfolios. The above mentioned improvement was hedged by the capital requirements due to operational risk. The final level of capital requirements improvement may be accomplished by specific provisions allocation for loans that were defaulted. If provisions coverage is low, then for the three representative Banks, higher capital requirements will be occurred (in relation to Basel I). Bank 1, in this case, incurs lower increase, while Bank 3 has the higher one. If coverage rate increases, capital requirements for all three banks will be reduced.

For the quantitative analysis that was conducted, the below issues were concluded: Bank 1 in the first scenario, which corresponds to low coverage of special provisions, has a marginal increase in risk weighted assets (0.66%). For the second scenario, which corresponds to an average coverage of special provisions, risk weighted assets were equal to zero. In the third scenario, where coverage of specific provisions was adequate, risk weighted assets were decreased by 0.63%. Risk weighted assets for Bank 2 were increased, for the first scenario (2.26%), while in the second scenario the increase was equal to zero. For the third scenario, risk weighted assets were decreased by 1.25%. Finally, for Bank 3 an increase in risk weighted assets is observed in the first scenario (4%), lower in the second one (2.7%) while the lowest is in the third scenario (1.25%). Based on these increases, capital adequacy ratio is accordingly affected. For all Banks, the greatest relief is observed to mortgage, consumer and SME portfolios. The relief is due to the risk weight of performing mortgages loans (35% from 50%-Basel I) and performing retail loans (75% from 100%-Basel I).

Banks focusing on retail (such as Bank 2) are likely to benefit the most, due to risk weighting based on theoretical issues, which is contrary to study's results. This conclusion could be driven by the additional capital requirements of non-performing loans and operational risk that are hedging this relief. Retail loans, excluding mortgages, include more loan loss provisions. Moreover, capital requirements due to operational risk were increased due to the spread that these loans have.

According to the study, capital ratio is calculated, as for standardized approach, with the below factors (order of priority): (a) Exposures by type of assets (b) Collateral allocation, especially for individuals' property (c) Defaulted loans percentage. Special provisions due to delinquent and bad debt may decrease defaulted loans charges and relevant risk weights (as in Basel I level).

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